1: Karsten--39 [2] (1916-18) 1935 Jivaro
132 (1928-29)

"At Canelos, which is situated at a height of about 800 m. above sea-level, the temperature is quite tolerable, but from Sarayacu downwards the heat increases daily, becoming at last extremely trying for one travelling by canoe."

5: Reyes and Teran--69-92 (No date) 1939 Jivaro-1
116, 132

"The Amazon basin's situation in the center of the torrid zone, together with its low altitude and the orientation of the continental ranges, permitting the direct influx of the Atlantic trade winds, gives it a clearly equatorial climate of the continental type. According to the classification of Emmanuel de Martonne, equatorial climates should have, in general, a mean temperature of 25° [GCB: Centigrade], a relative humidity of 80 excepting in the dry period, uninterrupted heat, frequent storms, and an annual precipitation of more than 1,500 millimeters, but in continental [GCB: regions], naturally [70] some of these characteristics vary a little. Thus, the humidity is less, while the temperature, on the other hand, is higher and the rain does not fall as regularly.

However, the Ecuadorian Oriente cannot be regarded as having a complete [GCB: climatic] uniformity, since the slopes of the Andes and the plains proper differ, on the one hand, in relief, and on the other, in the greater nearness of the former to the cordillera, where the trade winds release a great part of the moisture which they have collected [GCB: in their course] from East-Southeast to West-Northwest. These factors have resulted in the establishing of two zones with well marked climatic differences: that of the Andean slopes and that of the plain near the Amazon.

(a) The Andean Slopes: In this sector, the altitude, which often exceeds 400 meters, causes a decrease in temperature, as we have seen, thanks to the data, even though meager, furnished by the bulletin of the Astronomical Observatory [71] of Quito. But

on the other hand, because of the fact that this region adjoins the wall of the Andes, against which are condensed immense masses of water vapor gathered up by the trade winds from the Atlantic, the humidity is considerably increased, in comparison with the amount released over the plains proper. Not very far from the Andean cordillera is the belt of maximum rainfall. In this belt are points where the rain gauge might measure more than 5,000 millimeters annually, according to J. Colony and Joseph Sinclair. For this reason, the area might well be classed among those of the super-humid type.

Here [GCB: climatic] conditions are defined, then, only by the scale of the rain gauge. There is a summer and a winter--less rain in the first case and a maximum in the second. These conditions, which are directly inverse to those on the Pacific coast, coincide with the astronomic conditions of the Southern Hemisphere. The [72] winter season lasts from March to October, becoming intense in June and July; the rest of the year is summer. The rains are true deluges which leave great areas flooded, and swell even the smallest streams to fantastic heights. The following numerical data confirm this assertion:

'In all sections on the slopes of the Cordillera Oriental, precipitation is very considerable. We do not know at what average altitude on the slope of the Cordillera the precipitation is greatest. In Mera during the first five years [GCB: of the record] the

precipitation had a total mean of 4, 555 millimeters. Durin of 5, 530 millimeters of rain fell; in 1932 the precipitation w 1933 5, 051 millimeters. Assuming that these observations a quantity of rainfall varies in no small proportion. The mon variable; a dry period hardly can be distinguished; the data similar [GCB: publications] are not confirmed by measuren general rule the greatest precipitation is expected between t August. In 1932 the maximum precipitation [GCB: for any c --fell in May. Almost the same quantity--690 millimeters- the same year]. The minimum--319 millimeters--fell in Se imum--609 millimeters--fell in July; the minimum --242 m

In the same settlement of Mera, in 1927, 4, 869 millimete days. In Tena [GCB: another settlement] the totals for eigh 4, 885 millimeters in 1929; 4, 475 in 1930; 3, 466 in 1931; 3, 23

"1. 'Contribuciones al conocimiento de la Vegetacion y de Ludwig Diels. Translated [GCB: into Spanish] by Dr. Reina Universidad Central, No. 304 Quito-Ecuador."

3, 327 in 1934; and 3, 828 in 1935. These totals average 3, 902 millimeters for the eight years. In [GCB: the settlement of] el Puyo, an average of 3, 945 millimeters fell during the period from 1915 to 1928, according to data taken by [74] Nicolas Martinez. In La Victoria, on the slopes of el Abitagua, near the Topo river, at an elevation of 1, 240 meters, the [GCB: average] rainfall was 2, 863 millimeters. From other points in the Oriente we do not have complete annual figures; but to give a rough idea of the amount of difference between some months and others, we have compiled the charts, however incomplete, which are presented below.

The winds which control and cause these rains are the trade winds. The wall of the Cordillera Oriental impedes their passage, except in small sectors of the mountain basins whose valleys face toward the Oriente. For this reason the trade winds are not found either in the mountains or along the coast. Sometimes these winds are changed into hurricanes, leaving swaths through the midst of the forest which mark the direction they have followed.

With this respect to temperatures on these slopes or outliers, they [75] generally do not exceed 25 degrees [GCB: Centigrade], nor do the variations, whether daily or monthly, undergo too sudden changes. Summing up his observations at the Hacienda Río Negro at an elevation of 1, 250 meters above sea level on a terrace of the Pastaza river, Ludwig Diels writes in the above mentioned work:

5: Reyes and Teran--69-92 (No date) 1939 Jivaro-5
116, 132

'During my stay, I noticed that [GCB: the temperatures] each day followed a similar course. Toward 7 [GCB: a. m.] the temperature reached 16-17 degrees [Centigrade]; after mid-day, between 13 and 15 o'clock [GCB: 1 and 3 p. m.] it reaches 23 to 27 degrees; at night, at 19 o'clock [GCB: 7 p. m.] 20-23 degrees. During the morning there was generally heavy evaporation [GCB: mist?] which was dissipated about 10 a. m. ; it then cleared up, and the sun would appear toward noon; in the afternoon it would regularly become cloudy; toward 5 to 6 p. m. it ordinarily began raining, sometimes in the form of a storm which increased in intensity up to 7 and 8 p. m. , diminishing slowly and generally lasting until sunrise. '

According to the information of travelers, this course of [GCB: the day's time] is characteristic of the eastern slopes. More precise measurements are available only from Tena, situated 8 kilometers to the east of Topo, at an elevation of 1, 100 meters. They pertain to several years (1922-26 and 1932-33).

The temperatures found on the Upper Pastaza are about equal [GCB: to those of Tena] in their distribution. The difference between the highest and the lowest monthly temperature is, in Baños, 1. 8 to 2. 6 or degrees; in Mera, 1. 5 to 2. 1 degrees; perhaps in el Topo it may be even somewhat less. The general characteristics of the course of the temperatures are illustrated by the values for Mera, at an elevation of 1, 100 meters,

in 1933.

In Tena, at an elevation of 512 meters, the hot month of the year has a mean average temperature of from 24.1 to 25.8 degrees [GCB: Centigrade.] The coolest month has temperatures which average 2.1 to 3.7 degrees lower. The coolest time of the year falls between June and July. [87] [Intervening pages are charts.]

Complete data are lacking even for one year, and with greater reason, for cycles of greater magnitude, so that it is risky to formulate general conclusions. However, by means of the above figures it may be seen that the months of high temperature coincide with those of the eastern summer, culminating in December. In the same way, the months of least temperature coincide with those of the winter in the same hemisphere, reaching major emphasis in June and July. The rains, on the other hand, become increasingly heavy following the March equinox, and attain their maximum in May and June, although their cycle is less regular than the thermal one.

(b) Amazon Plain If the climatic data of the zone we have called that of the Andean slopes are thus so meager, we may well understand the situation in this other region, whose domination by man has not yet even begun. Suffice it to say that [88] Rocafuerte, at the confluence of the Aguarico river with the Napo, still lacks a small meteorological station. Located at an elevation of 180 meters, Rocafuerte is today the most remote military base of Ecuador in its campaign to dominate the inhospitable forest.

5: Reyes and Teran--69-92 (No date) 1939 Jivaro-7
116, 132

The data referring to Iquitos, on the left bank of the Amazon, at an elevation of 80 meters above sea level, were collected by Wilhelm Sievers and may serve as a means of estimating the climatic conditions of the Amazon plain proper. At 3.44 degrees, South latitude, Iquitos has an average annual temperature of 26 degrees [GCB: Centigrade], with a variation of only 1.7 degrees; in fact, November, the hottest month, does not go above an average of 26.9 degrees, and June, the coldest, does not go below 25.2 degrees. The averages of the extremes also fall within a very narrow range--32.4 and 18.4 degrees--but the winds from the South bring with them in June and July, nevertheless, a considerable cold spell which [89] constitutes what is called el inviernito [GCB: little winter] of Saint John.

According to Hann, the total annual precipitation [GCB: at Iquitos] is 2,840 meters; according to Votz, it totals 2,623, but what chiefly characterizes the rainfall is that no month passes without abundant precipitation. Even the driest months, August and July, receive more than 100 millimeters--117 and 167 respectively. As for the most humid months, March and December, the totals are 291 and 300, [GCB: respectively.] Thus there is no well defined season of rainfall, but the year has four periods of maximum precipitation: one in March, a second in December, a third, of 254 millimeters, in May, and a fourth, of 221, in September. It may be said, nevertheless, that the type of the annual rainfall is that of the eastern hemisphere, since in the months from

December to March fall 1,112 millimeters of rain, or about 42 per cent of the year's total. The winds are generally cool and from the southwest from June to [90] November, and warm and from the northwest during the rest of the year.(1)

If by means of the above data this [GCB: Amazon plain] region is compared with the former [Andean slopes] zone, the following differences are immediately apparent: in temperature, the figures for the second [GCB: or plain] region are higher than those of the first, commonly exceeding 26 degrees [Centigrade], while in rainfall just the opposite occurs. Here [GCB: in the plain] the precipitation rarely exceeds 3,000 millimeters.

To sum up several aspects of the climate of the great Amazon Basin, we cannot resist quoting the following paragraph which through its excellent metaphor brings home a profound geographic truth. 'The mist in the Llanganati is omnipresent. This is easily explained. A muddy tropical caldero [GCB: caldron or basin] with an area of about three million (?) square kilometers, like that of the Amazon, [91] which lies at the foot of the Llanganati, we can easily understand, must be incessantly evaporating millions of tons of water, resulting in the formation over itself of an enormous continent of clouds. But this 'continent' moves, advances and attacks without repose, like

"1. 'Geografía de Bolivia y Perú' por Wilhelm Sievers. Colección Labor, Número 288."

a cosmic nebula which comes to battle and destroy itself against the Andes to give birth to the immense Amazon. But above all, the cold and elevated granite masses of the Llanganati, advancing as they do toward the east, are the ultimate condensing agents which force all these dynamic masses of clouds, progressing enslaved from East-Southeast to West-Northwest in the arms of the tradewinds, to precipitate themselves in the form of torrents of water, as they erode the high Andes and level their peaks.(1)"

"1. 'Viaje a las misteriosas montañas de Llanganati' por L. Andrade Marin. Quito, 1936."

20: Dyott--181-182 (no date) 1926 Jivaro
116, 132, 241

"At the first streak of dawn, Napi took his departure. There was no elaborate leave-taking. Conversation simply reached a crescendo, and after the climax, the final word, 'pumata' was spoken in subdued tones. With this brief farewell the visitor disappeared down the pathway and the jungle swallowed him up.

After breakfast, Johnston and myself joined the ladies on their daily excursion to the family banana patch, as there was not much chance of hunting when issues of life and death were at stake. Kuashu was the only man to accompany us, the others remaining at home engrossed in their warlike preparations.

It was a very dreary morning. Rain threatened any moment and the water-logged clouds dragged themselves wearily over the tree-tops. Within ten minutes after starting, we found ourselves on the edge of a substantial clearing, half of which was planted with yuca and banana, the remain- [182] ing portion being barren. It was not even ready for planting, as the trees had only recently been felled. Some of the clearing had received a preliminary burning off, but most of the wood was still green. Huge trunks lay prostrate on the ground, and as we clambered over them Johnston remarked that the word 'clearing' was very inappropriate for a place so littered with obstructions."

20: Dyott--186
116, 132

(no date) 1926

Jivaro

"We were about ready to start back to the house when the rain suddenly descended upon us. Without word or warning it came tumbling down vertically out of the clouds, beating on the leaves of the trees and producing a terrible racket. Our friends immediately discarded their clothes, wrapped them up carefully so as not to get wet, and with big banana leaves over their heads, to act as umbrellas, beat a hasty retreat.

Radiantly beautiful as the jungle is when bathed in sunshine, it becomes the most dismal place conceivable when rain falls. The gloom which pervaded everything seemed to penetrate even into Kuashu's house and to be cooped up in its forlorn interior the entire afternoon was rather trying."

18: Hermessen--448 [2] (No date) 1917 Jivaro
116, 132

"The mean temperature at Jamboé was approximately 22° C. (71.6° F.). The diurnal variation was small but sufficient to render the nights agreeably cool. The atmospheric humidity was probably high. The annual rainfall I judged, by the aspect of the vegetation and other indications, to be between 80 and 90 inches; and this was evenly distributed, there being no well-defined wet and dry seasons. "

29: Vité- -22[2] (1934) 1935 Jívaro
116, 122, 132

The appearance of the equatorial rains which arrived a month earlier than expected this year, prevented us from traveling across Ecuador and Brasil to the Atlantic. We were not able to continue our task after a month's sojourn in the interior of the country, and we had to return to Guayaquil where we embarked on our return to Italy.

/327 cont./

133 to the Amazonas as the Rio Pastaza. Our route soon leaves the highland of Riobamba, formed by the masses from volcanic eruptions which fill the deep depression between the ridges of the east and west Cordillera, which were built up out of older rock. The bipartition of the Cordillera disappears almost completely. The river cuts through at Cebadas, the last village, on the dividing line between syenite and mica schist, and higher up its bed lies wholly in the latter rock. The higher we climb, the narrower and wilder the gorge becomes, cultivated fields disappear, and in their place comes the tall páramo grass, the ichu of the natives. Toward the end of the second day of travel there appear in the background of the valley high, jagged peaks whose black ridges and crests tower up out of blinding white snowfields. These are the Cerros de Zhasquin, Yanaurcu, and Púlpito, which represent here the highest elevations of the East Cordillera. Suddenly the character of the valley changes: the narrow gorge turns into a wide basin filled with swamps and lakes, surrounded on both sides by high greenstone cliffs, almost open toward the east, since an almost imperceptible rise forms the watershed between two small lakes, Cazadoracocha and Cocha redonda, the first of which, in conjunction with Colaycocha, is the source of the Rio de Jchubamba, whose valley we have followed to this point, whereas the latter drains to the east as a tributary /328/ of the Rio Upano. At the entrance to this flat highland valley, whose whole configuration reminds one of the lakes at the source of the Inn and along the Maloya Pass, there are a few wretched huts: Atillo, at an altitude of 3,452 meters, inhabited only from time to time. The lakes Colaycocha and Cazadoracocha are at about the same level, and the watershed extends only to a height of 3,548 meters, whereas the surrounding mountains tower to a

132 height of about 4,300 meters. This region is unbelievably desolate and dismal; wrapped in rain and clouds almost the whole year, only occasional stunted tree-like underbrush grows here among the large areas of grass; the trade winds blow icy cold the greater part of the year. An average annual temperature of 8.8° C. in a country located so close to the equator is evidence

/328 cont./

132 of an inhospitable climate, the unpleasantness of which is heightened even more by the abundance of moisture which, rising from the plains of the Amazonas, falls here on the high mountains. Even the Indian, who otherwise loves the high páramos, stays here only a short time. The huts of Atillo serve the inhabitants of the small village of Suñag, located on the downward slope toward Mácas as a sort of temporary shelter on their journeys to maintain the mission's contacts with the capital, Riobamba.

132 136 The Ecuadorian speaks of Atillo, of Colaycocha, and of the pass to Mácas only with a mysterious horror; poisonous vapors are said to rise from the small lakes, so that every bird flying over them falls dead. The dead birds are said to be found by the thousands on the shores of the lakes, especially of Cazadoracocha, which for this reason has retained the name of Hunter's Lake. Armed with baskets and sacks, the Indians go out to collect the fallen animals in order to sell them in the neighboring cities. This is one of those mysterious tales which, like the marvelous story of the fish spewed out of the volcanoes, can be traced to poorly observed facts, distorted by exaggeration and misunderstanding. That is, in Ecuador, as in almost all of South America, there is a number of snipe, ibis, and heron-like migratory birds which leave the hot country with the onset of good weather in order to seek their nourishment in the highlands. With the onset of bad weather they then return again to the hot country. These birds appear in masses in May or early June and stay until September. The animals seek the lowest passes to cross the Cordillera. Thus they follow the course of the Rio Cebadas in order to cross the watershed, lying between high mountains, toward the east near Colay and Cazadoracocha. In September, however, the trade winds, which press through the narrow pass with terrible force, often rage with hurricane-like violence. The force of the wind, which frequently a horseman can hardly withstand, throws back the birds, rising from the protected valley floor, as soon as they reach the top of the pass. The stronger animals can force their way through, but many of the weaker and smaller birds /329/ are overcome by

/329 cont./

132 the ice-cold wind, often driving hail and snow in front of it.
136 Exhausted by the many vain attempts, they meet their death in the lake, piling up on its shores.

I crossed this pass in the best season, in the month of
132 December, but even then the Indians accompanying me, in
114 spite of the fact that all had been accustomed to mountain climbing for a long time, suffered from the penetrating cold and wetness.

One has hardly reached the end of the swampy highland
133 valley and climbed the low ridge to the side of the Cocha redonda when the whole scene changes abruptly. One stands at the edge of a steep cliff, over whose wall a brook flowing from the above-mentioned Cocha falls in a high waterfall, a deep gorge filled with dark-green forest lies at our feet, and stunted trees go up as far as the edge of the pass. One imagines the spicy air and mild temperature of the warm country and feels invigorated; even the Indian, already dejected and stiff with cold, takes fresh courage at the sight of the montaña, the land of wondrous fertility. One descends steeply in zigzags along the cliff wall, the waterfalls are crossed several times, until the first valley floor is reached. The vegetation becomes more luxuriant with every step; we find ourselves in the zone which Pöppig portrayed so excellently in his description of the Ceja. We found Suñag (2,688 meters), a small village consisting of 15-20 wooden huts and a chapel, deserted; all the inhabitants had gone farther down the valley to harvest maize at Chanala (2,470 meters), Chillan, Puentehondo. The six or seven houses which make up the village of Paira (1,617 meters) lie two short days of travel farther down in the valley. The foot of the steep mountains has been reached here; only elongated hills continue to the east. The rivers, still rapid, to be sure, become broad and even navigable for short stretches;
491 an immense forest area stretches out before one's eyes. Up to here we found the brooks, which were difficult to cross, bridged over, although the liana bridges, serving as a model for our suspension bridges, sometimes offered crossings which appeared

34:Harner E-4, 5 (1956-1969)1973 SD9 Jivaro SD9

28. Vacas Galindo, 1895, pp. 49–50; Anonymous, 1952, p. 38. 000
29. Karsten, 1935, p. 8.
30. Anonymous, 1952, pp. 32–33; 38.
31. Platt, 1932, pp. 93–94.
32. Most of the following historical information is derived from oral accounts of older Ecuadorian colonists and Jívaro. [173]
33. See Stirling, 1938, Plates 11–17.
34. Dirección General de Estadística y Censos, 1954, pp. 138; 141. These figures include the population of Macas. The Summer Institute of Linguistics aerial survey counted 256 Jívaro houses in the same region in 1956.
35. Brown, 1961, pp. 22, 31, 58–9, 190–94.
36. Macabeo and Jívaro oral histories. [173]

CHAPTER II

1. Although rainfall is fairly heavy, it is well distributed throughout the year, and the distinct seasonal differences found in much of tropical forest South America are not as evident here. Short term records are available for rainfall and temperature at the Ecuadorian settlements of Macas, Méndez, and Gualaquiza, all in the higher western portion of the region. These reports of annual rainfall range from 1,992 mm. at Gualaquiza to 2,599 mm. at Méndez, with the minimum for a single month at any station being 95 mm. Recorded average temperatures from these same stations range from 21.4 to 25.2 degrees Centigrade (Ferdon, 1950, pp. 73–74). 24 132 •
2. Cf. Steere, 1950, p. 85. 000
3. In an earlier paper (Harner, 1962, p. 269) I questioned whether the Jívaro had any gods or goddesses, but additional field study and analysis have led me to be less certain of the classificatory status of Nunui and, in fact, of the definition of "gods" and "goddesses" in general. [128]
4. Demons lack blood. [176]

CHAPTER III

1. Based upon a Summer Institute of Linguistics aerial survey in 1956–57 (Glen Turner, personal communication). The Jívaro population near the Macuma and Yaupi missions, comprising some eighty houses, is specifically excluded in the total here. 361 161 114

   The Summer Institute of Linguistics personnel were employing an intentionally conservative estimate of five persons per dwelling, which was used for earlier population estimates by the author (Harner, 1962, p. 259; 1963, fn. 9; 1968b, p. 363). Additional research has led the author to revise the estimate of average household population upward to nine, and this is the figure employed in the present study. It seems impossible, however, to reconcile my results with those